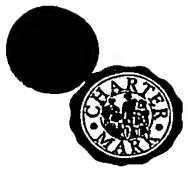


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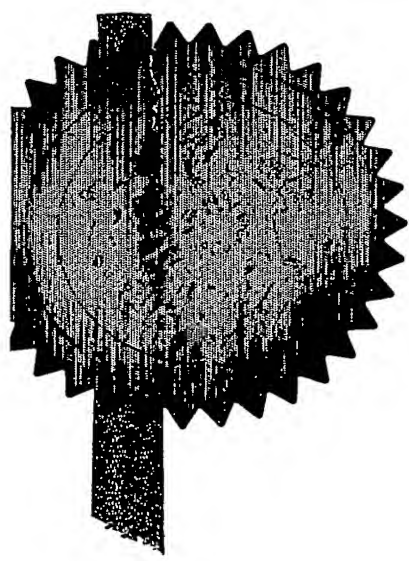
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I also certify that the attached copy of the request for grant of a Patent (Form 1/77) bears an amendment, effected by this office, following a request by the applicant and agreed to by the Comptroller-General.

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Dated 10 November 2004

Patent Act 1977
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- 4 NOV 2003



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The Patent Office

Cardiff Road
Newport
South Wales
NP10 8QQ

1. Your reference

2. Patent application number

(The Patent Office will fill in this part)

0325682.3

4 NOV 2003

3. Full name, address and postcode of the or of each applicant (underline all surnames)

MR PAUL NICHOLAS ROGER MICHAEL

4 BUTTERFIELD

WOOBURN GREEN

BUCKS HP10 0PX

ISAAC

Patents ADP number (if you know it)

If the applicant is a corporate body, give the country/state of its incorporation

7348824002

8311854001

4. Title of the invention

A SHIELDED LOCK

5. Name of your agent (if you have one)

"Address for service" in the United Kingdom to which all correspondence should be sent (including the postcode)

Saunders & Dolleymore
9 Rickmansworth Road
Watford

PS1/77 4-11-04

4 BUTTERFIELD

WOOBURN GREEN

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Patents ADP number (if you know it)

Hebbs

WD18 0JU

6. If you are declaring priority from one or more earlier patent applications, give the country and the date of filing of the or of each of these earlier applications and (if you know it) the or each application number

Country

Priority application number
(if you know it)

Date of filing
(day / month / year)

7. If this application is divided or otherwise derived from an earlier UK application, give the number and the filing date of the earlier application

Number of earlier application

Date of filing
(day / month / year)

8. Is a statement of inventorship and of right to grant of a patent required in support of this request? (Answer 'Yes' if:

- a) any applicant named in part 3 is not an inventor, or
- b) there is an inventor who is not named as an applicant, or
- c) any named applicant is a corporate body.

See note (d)

Patents Form 1/77

9. Enter the number of sheets for any of the following items you are filing with this form. Do not count copies of the same document

Continuation sheets of this form

Description

Claim(s)

Abstract

Drawing(s)

6

777 2

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Priority documents

Translations of priority documents

Statement of inventorship and right to grant of a patent (Patents Form 7/77)

Request for preliminary examination and search (Patents Form 9/77)

Request for substantive examination (Patents Form 10/77)

Any other documents (please specify)

11.

I/we request the grant of a patent on the basis of this application.

Signature

Date 3-11-200

12. Name and daytime telephone number of person to contact in the United Kingdom

P. ISAACS
01494 437020

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A SHIELDED LOCK

The present invention relates to an electronic lock, and in particular, but not exclusively, to a lock suitable for cabinets, gates and doors, where authorised individuals need to gain access.

Existing locking devices, such as padlocks, with hasps and staples are well known, but suffer from the disadvantage that they are physically exposed to criminal attack, vandalism and environmental issues, such as water penetration. Padlocks in particular provide access, but usually to individuals having the same encoded 'key' or the like. Therefore if a key is lost or stolen the security is compromised. The present solution would be to replace it with a new lock, which would have different encoded keys.

The present invention allows for the 'intelligent' aspect of the lock to be re-programmed in the event of key loss to prevent access by individuals with unauthorised keys.

With reference to physical attack, new advanced types of cutting tools and machines are now available to criminals that have reduced the protection that these existing padlocks once provided.

The object of this invention is to provide a lock capable of overcoming all the disadvantages of existing locking devices. Firstly all of the working components of the lock are situated behind a protective outer cover, which is securely fixed or bolted to the moving gate or the door. The preferred operation of the lock is by 'intelligent' access. That is by, for example, 'smart cards', tags or tokens, infrared, radio waves or inductive coupling. Secondly a mechanical security cylinder is added to provide manual access and to override the working components in the event of failure of the electronic components or intelligent aspect of the lock.

The functions and advantages of electronic of 'intelligent' locks are well known, most of which would also be applicable to a lock in accordance with the present invention. The advantages of this new lock would be too numerous to list here, but by way of illustration the lock may, for example, be programmed as follows:

- (i) To provide single point access to many users – to electronically programme out of the system lost or stolen 'keys'.
- (ii) To provide an audit trail for the opening and closing of the lock.
- (iii) To transmit information and data over distances through the air by wireless means.

The design of this invention allows for the physical aspects of the protective outer cover to be enhanced with, say, extra layers of dissimilar materials to provide additional protection against a cutting or grinding attack. It is well known that grinding wheels 'clog' or malfunction under these conditions. The cover also provides protections against detrimental environmental ingress such as moisture, dust, insects, and to physical vandalism to the working parts.

Accordingly, this invention provides a lock case, which is secured to a moving door, on a cabinet moving door, or moving gate. It provides a staple, which is fixed to the corresponding matching opposite door or fixed post, or door jamb. A sprung-loaded security bolt integrated within the lock case which engages and disengages with the staple to secure and un-secure the lock. A deadlock pin is internally mounted to secure and release the security bolt. A motorised actuator powered by an electric circuit with an integrated transceiver is connected to receiving and transmitting antenna. The antenna will be capable of receiving an authorised signal from an electronic programmable card sometimes referred to as a 'smart card'. A battery pack would supply external electrical power to the circuitry. There will be connections to receive electrical power by external means as another option.

With reference to the battery powered applications, switches and associated components are internally incorporated to provide a 'wake up' facility to the circuitry, which is normally in 'sleep mode' therefore saving on power consumption.

A mechanical security cylinder is mounted within the locking bolt to provide manual access and to act as an override in the event of failure of the electronic element.

Preferably the lock-case is made of steel, which can be hardened to resist physical attack such as drilling and cutting with conventional tools. Dissimilar materials such as aluminium and plastic may be added to enhance the physical strength against grinding and to provide electrical insulation.

Figure 1 shows a perspective view of the invention fixed by bolts or other means to the moving leaf of a cabinet. The same principle of fixing would apply to gates or to a door with a fixed jamb.

Figure 2 shows a perspective view of the interior of the invention with cover plate removed for clarity, and latched open. An electronically programmable smart card or similar in a typical situation, together with a physical security key to provide access. A cutaway section of a fixed staple is shown to show the relationship of the lock case.

Figure 3 shows a front elevation of the lock with cover plate removed, and shown latched open, to show relationship with components.

Figure 4 shows a part sectioned front elevation of the lock and is shown latched open and primed, ready to close.

Figure 5 shows a part sectioned front elevation of the lock, latched closed.

Figure 6 shows a part sectioned front elevation of the lock, latched closed and with security cylinder and associated mechanical key.

Figure 7 shows a part sectioned front elevation of the lock latched closed, but with the cylinder rotated and lock primed to open.

Describing now the operation of the lock. Lock case 1 and staple 7 are installed on a cabinet, or gates, or doors so that security bolt 2 is aligned with aperture 3 in staple 7.

Authorised individuals on approaching lock case 1 manually depress security bolt 2 into Lock case 1 in the directions of arrow X shown on Fig 3, so that magnet 8 is aligned to sensor 9, which when activated sends a signal to circuitry 10, to 'wake up' its integral transceiver. On release of pressure security bolt 2, under pressure from spring 17 returns to open position in direction of arrow Y.

The duration of the 'wake up' of the electronic circuitry is timed to allow a signal from an authorised presented electronic Key 16, held in close proximity to Antenna 6, to be read by the transceiver element of control circuit 10.

On receipt of this signal the electronic control circuit 10, powered by battery pack 20, or by external power, controls the motorised actuator 11, coupled to pinion 12, to drive rack 13, and deadlock 15, in direction arrow A, shown on Fig 3, to position shown in Fig 4. In this position the lock is primed and ready to latch closed.

When security bolt 2 is manually depressed into Lock case 1 in direction X shown on Fig 4, deadlock 15 is engaged by bolt 2, and under pressure from spring 14, is displaced in the direction of arrow B, shown on Fig 4. Free play between deadlock 15 and rack 13 allows for this displacement. Bolt 2 is further manually depressed until notch 21 in Bolt 2 aligns with matching

profile on deadlock 15, allowing deadlock 15 under pressure from spring 14 to move in direction of arrow A, in to position shown on Fig 5. In this position the lock is latched closed, with bolt 2 engaged in aperture 3 of staple 7. Electronic circuitry 10 automatically switches off to go into 'sleep mode'. This completes the locking cycle.

Unlocking is similar in principle to the early stages of locking, in that the 'wake up' procedure is followed thus:

Authorised individuals on approaching lock case 1 manually depress security bolt 2, into Lock case 1, in direction of Arrow X shown on of Fig 3, so that magnet 8 is aligned to Sensor 9, which when activated sends a signal to circuitry 10 to 'wake up' its integral transceiver. On reverse of pressure security bolt 2 under pressure from Spring 17, returns to the latched position in the direction of arrow Y Figure 5.

As before, the duration of the 'wake up' of the electronic circuitry is timed to allow a signal from an authorised presented electronic key 16, held in close proximity to Antenna 6 to be read by the transceiver element of control circuit 10. On receipt of this signal electronic control circuit 10, powered by battery pack 20, or by external power, controls motorised actuator 11 coupled to pinion 12, to drive rack 13, and deadlock 15, in the direction of arrow B shown on Figure 4, to position shown Fig 3.

Bolt 2 is now automatically released and under pressure from Spring 17 moves in direction of arrow Y, as shown in Fig 4. In this position the lock is latched open and the circuitry is switched off automatically and goes into 'sleep mode' again.

Also incorporated into security bolt 2 is a mechanical security cylinder to provide manual access, and override, to give access in the event of failure to the electronic element.

Fig 6 is a part sectioned view to show the internal mechanism of the mechanical override.

The manual unlocking procedure is:

With the lock in the latch closed position, an authorised Key 4 is manually inserted into the security cylinder 5. When Key 4 is rotated in the required direction, cam face 18 of Bolt 2, displaces follower 19, which displaces deadlock 15 into the position shown on Fig 7. In this position Bolt 2 is free to disengage and under pressure from spring 17, can be released into the unlocked position, direction arrow Y shown on Fig 3.

The above description relates to one particular locking arrangement. It will be evident to one skilled in the art that other modifications or alternative arrangements will be within the scope of the claims.

1.

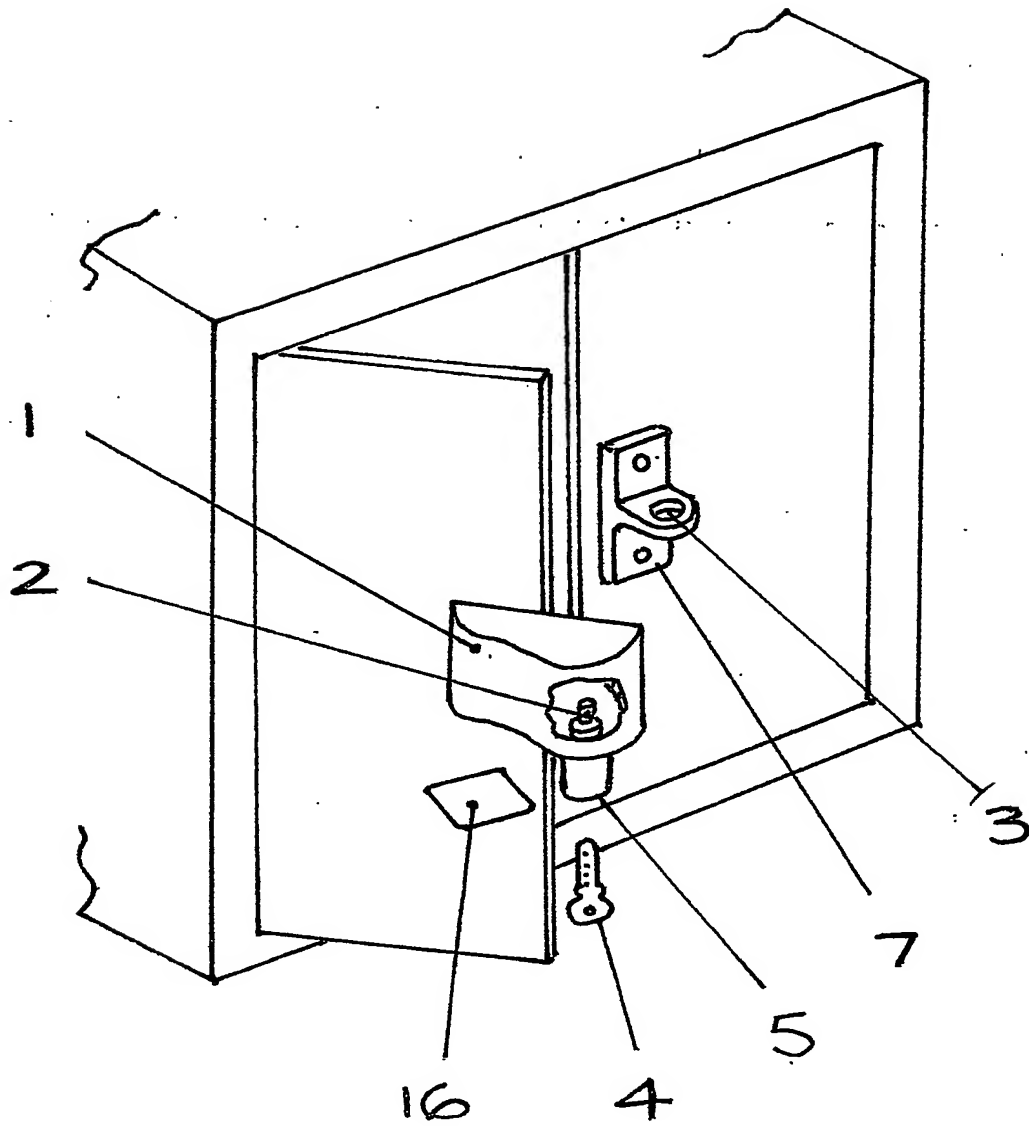


FIG. 1.

7.2

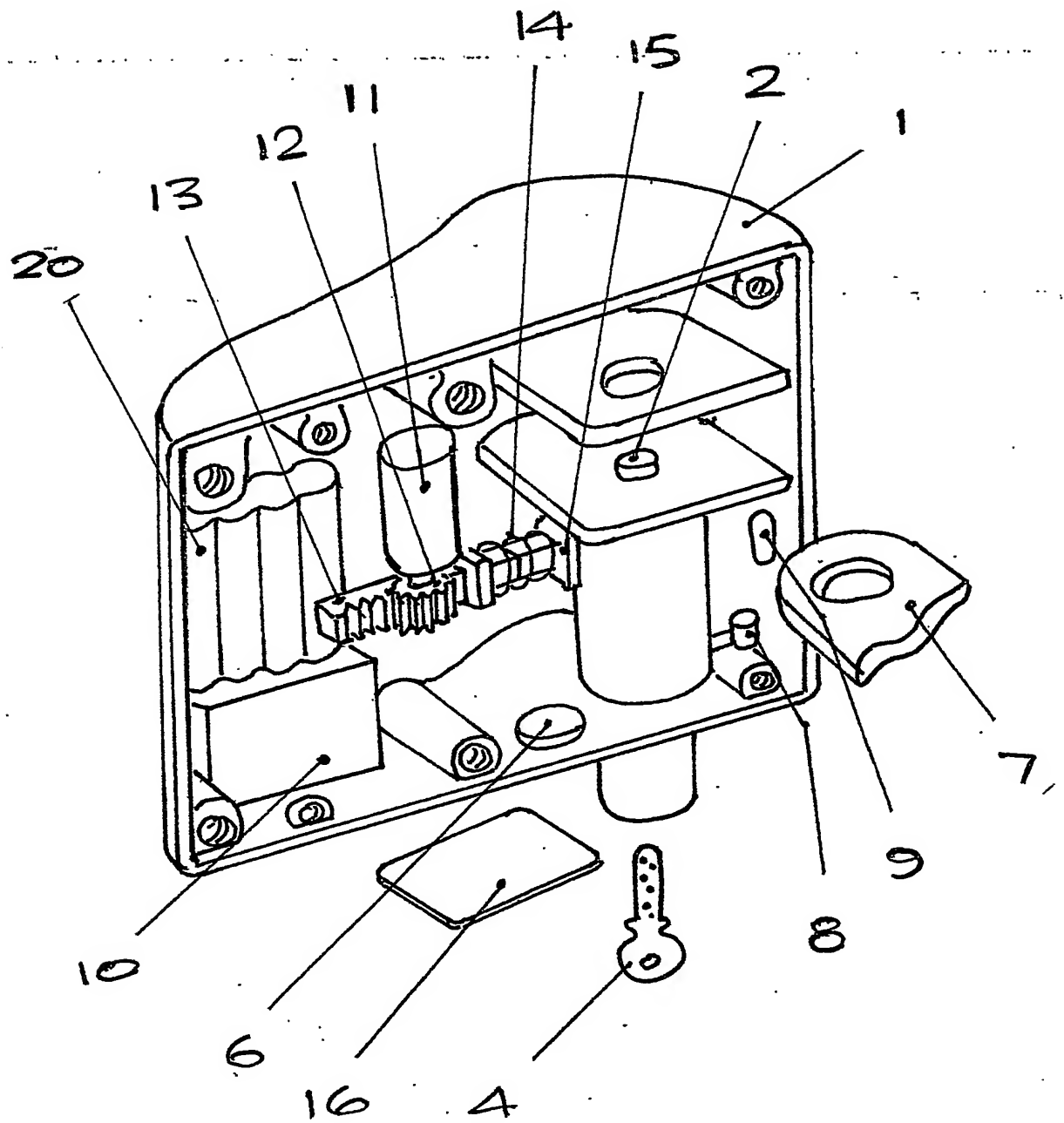


FIG 2

7.3

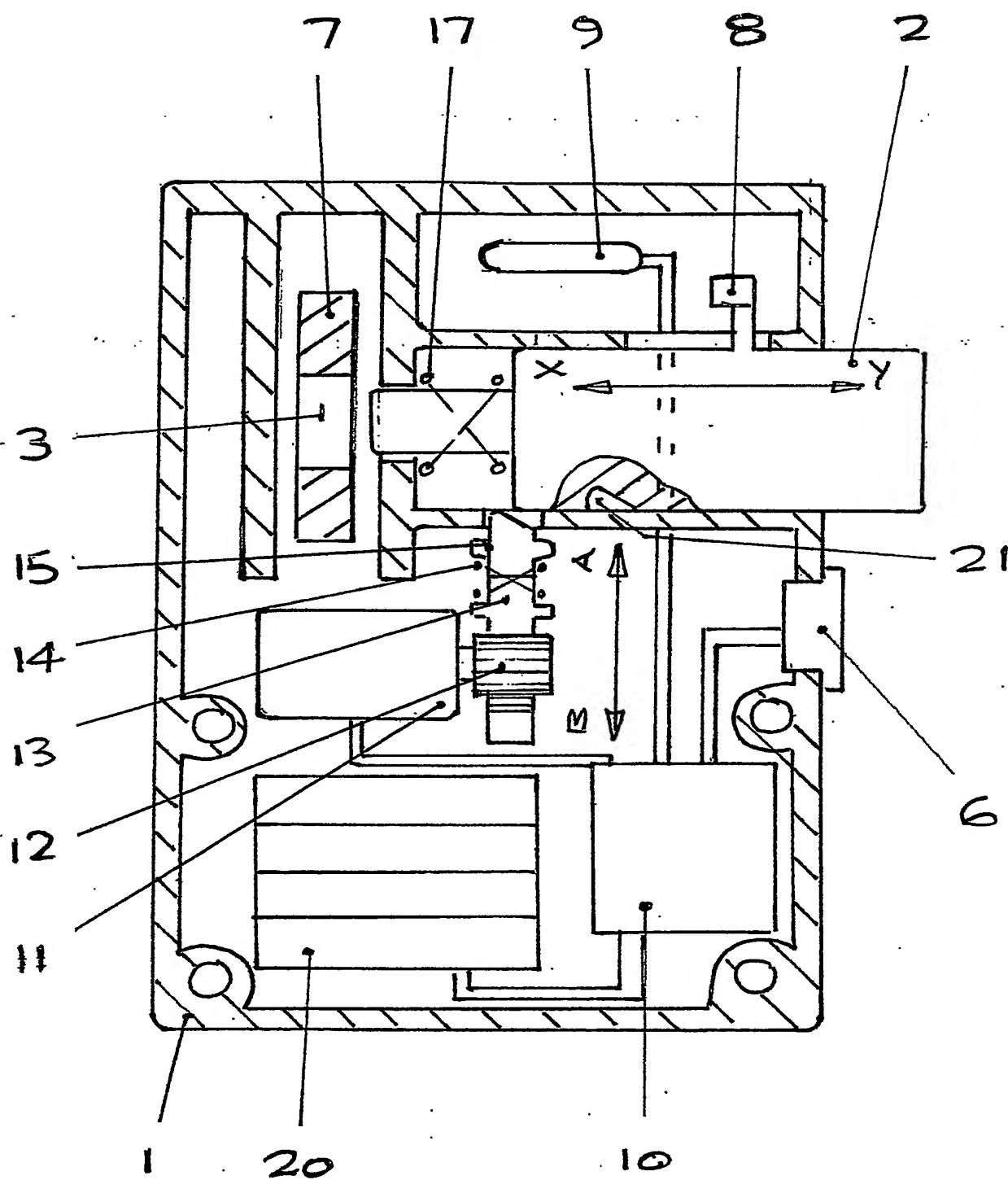


FIG. 3

7.4

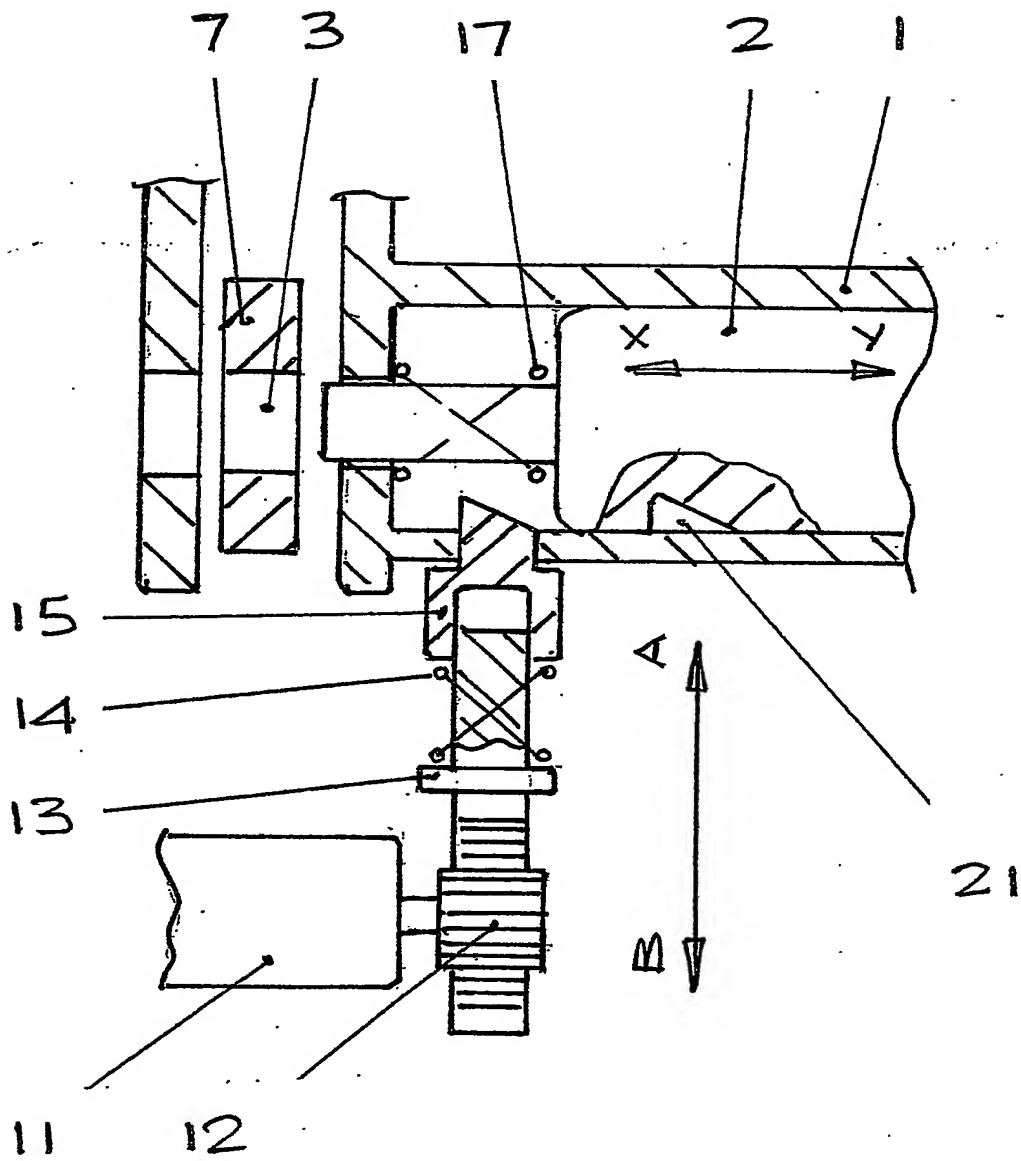


FIG 4



FIG 5

7.6

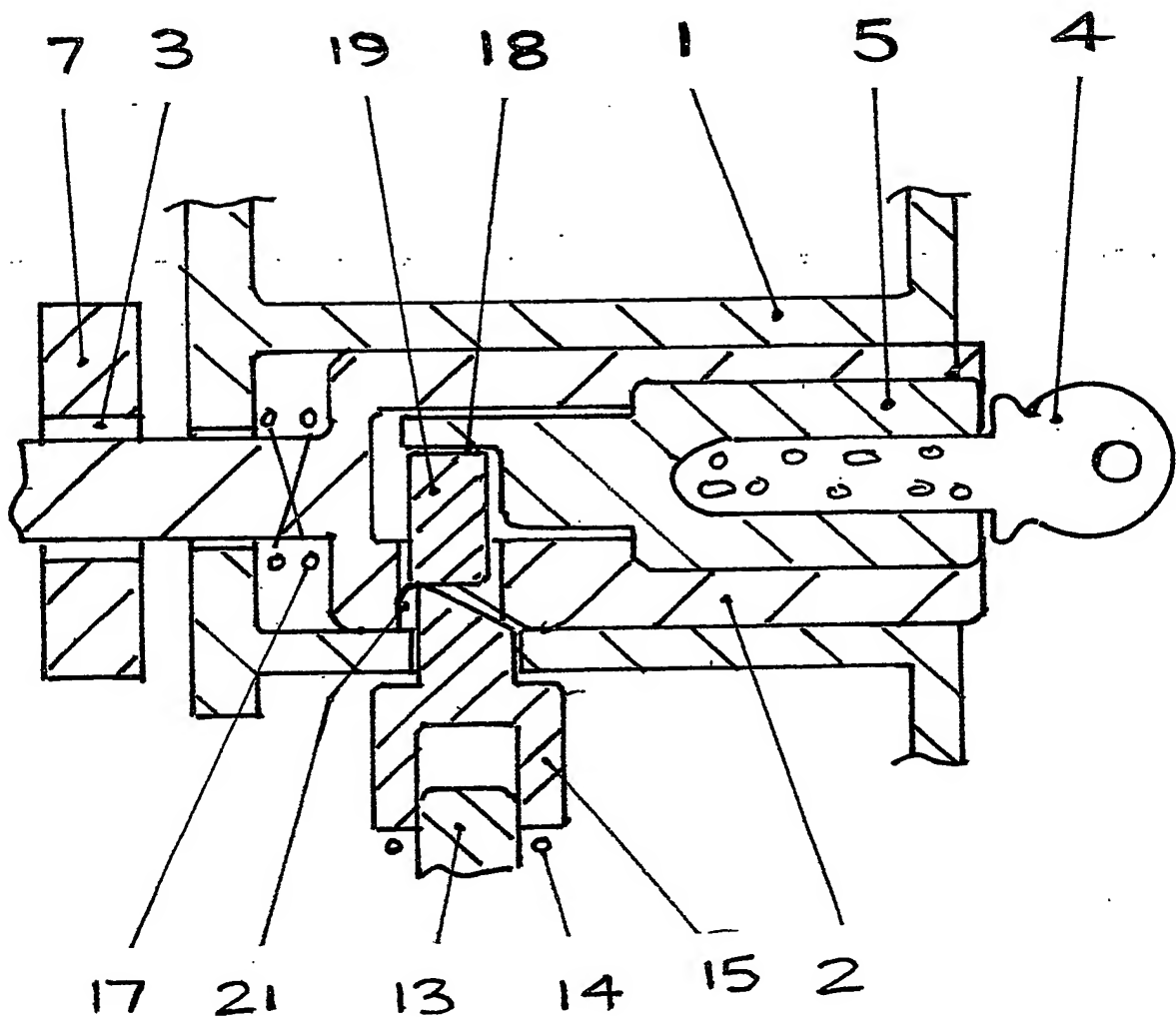


FIG 6.

7.

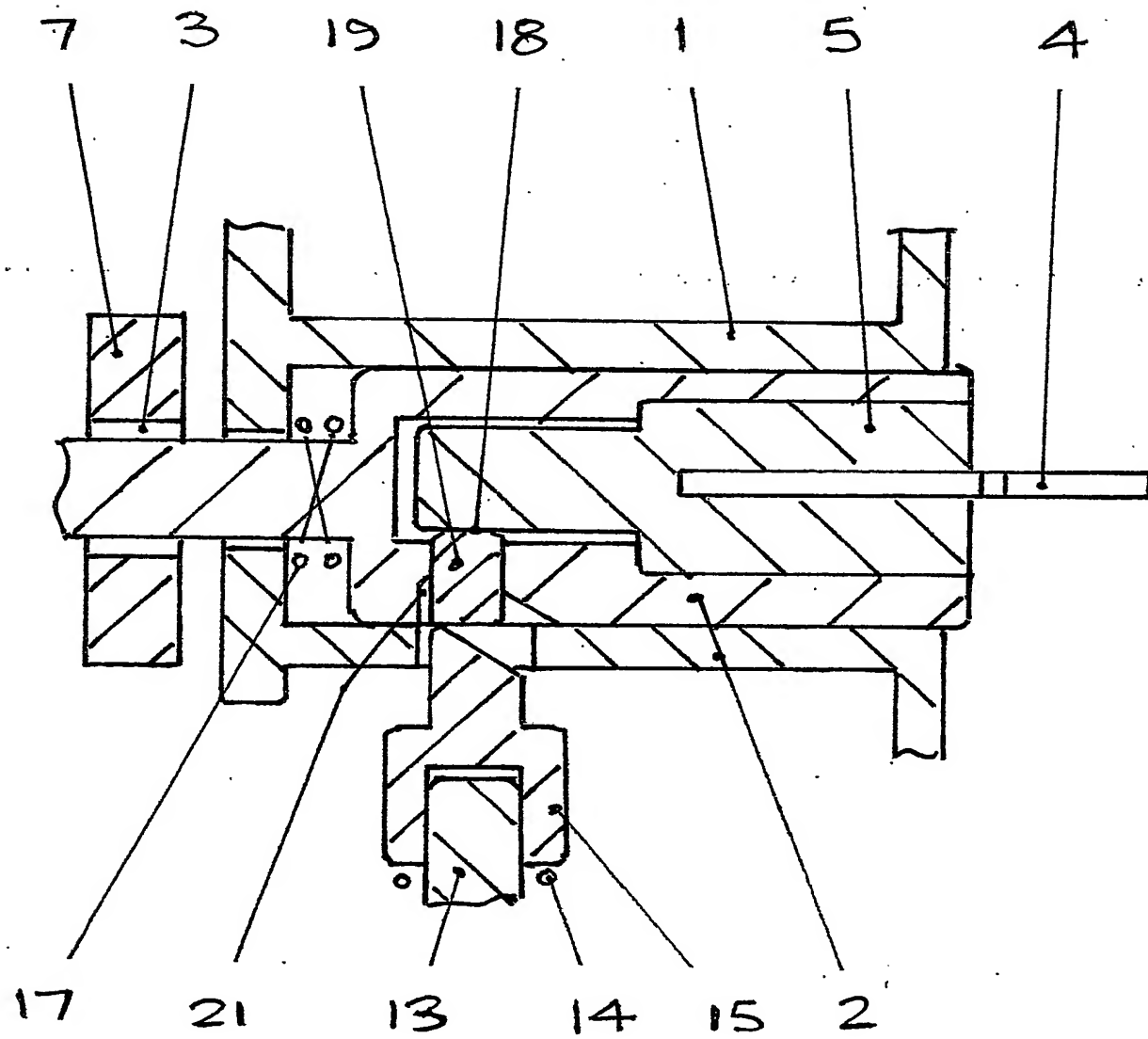


FIG 7

1.

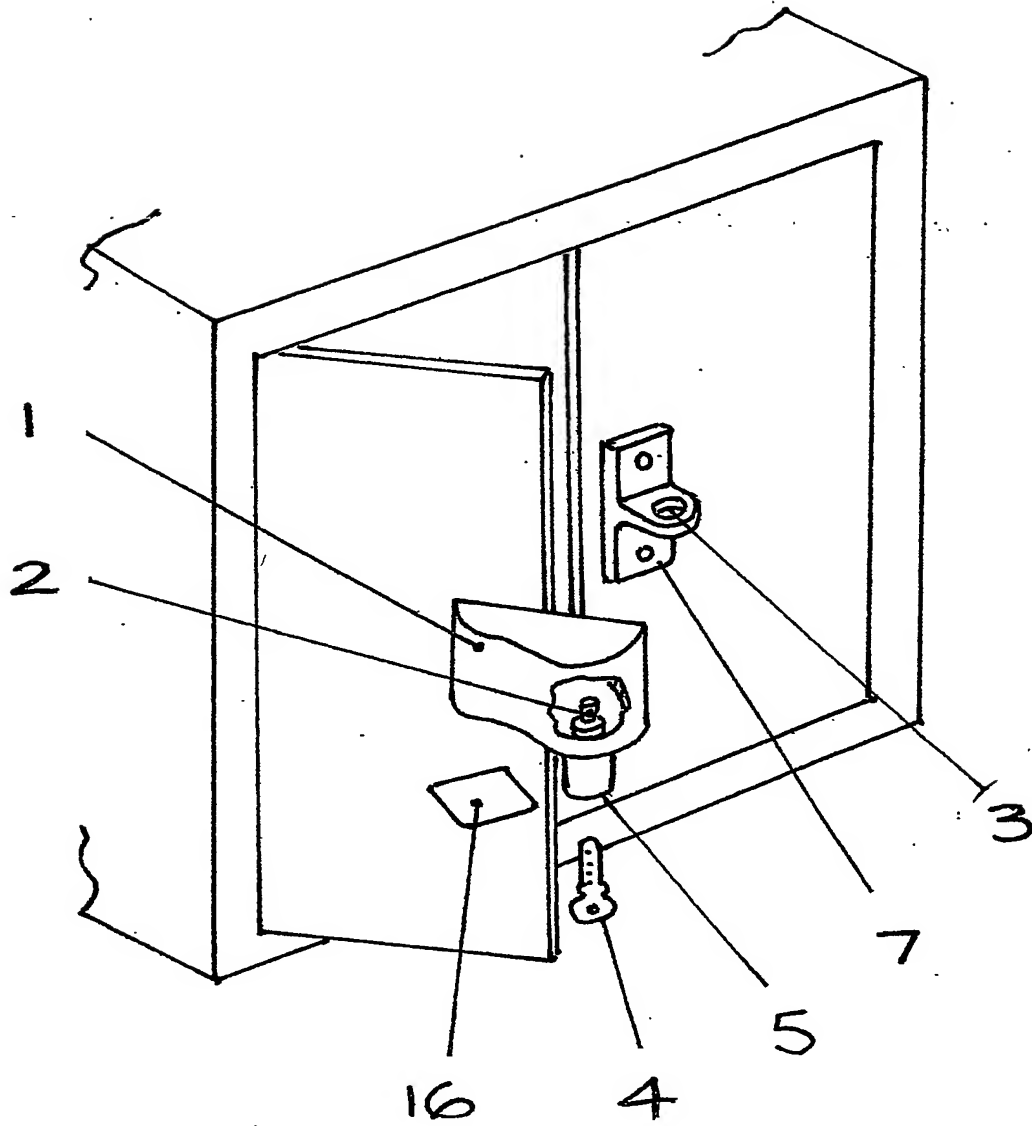


FIG. 1.

7.2

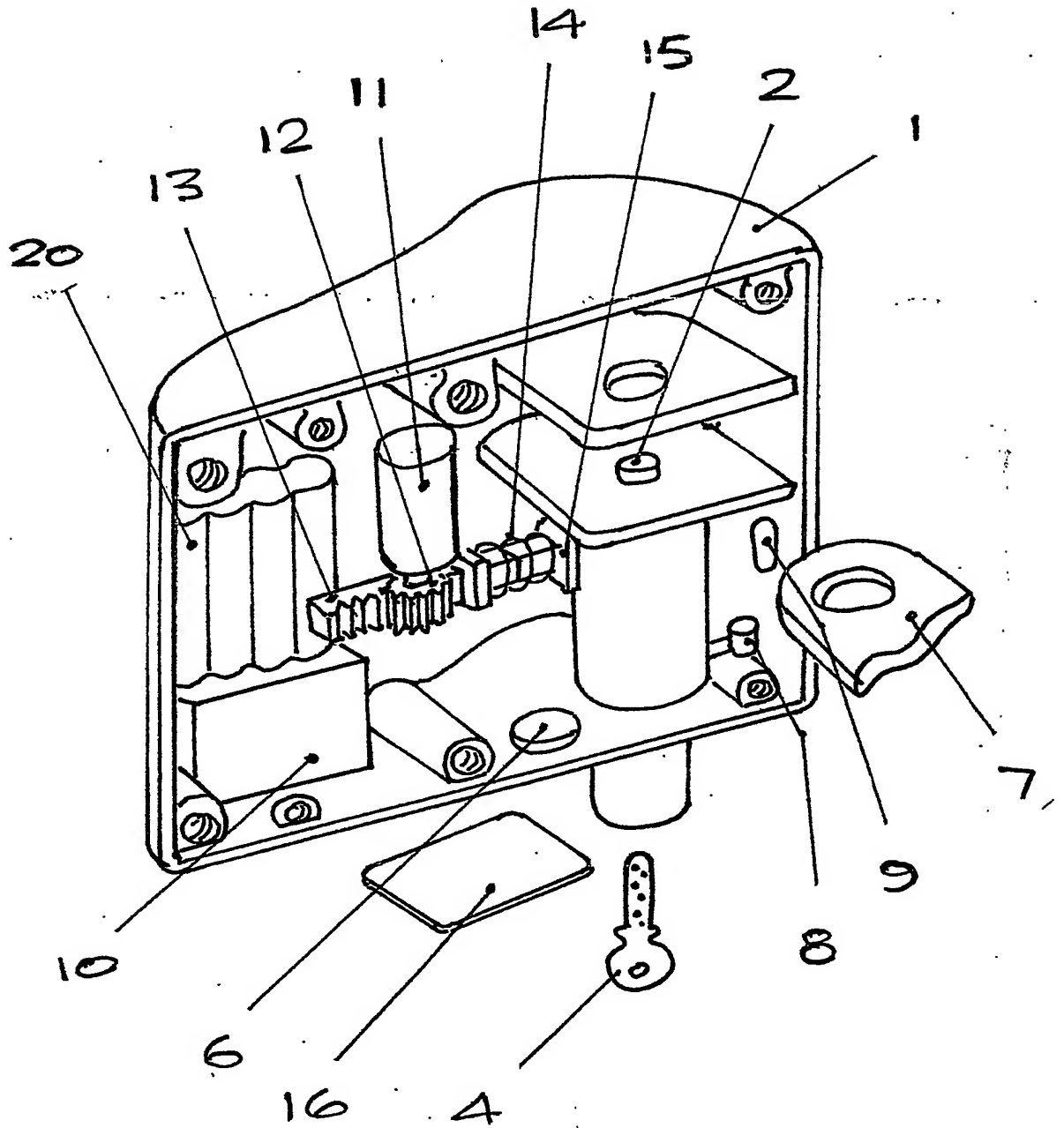


FIG 2

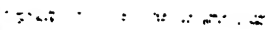


FIG. 3



FIG 4

7.5

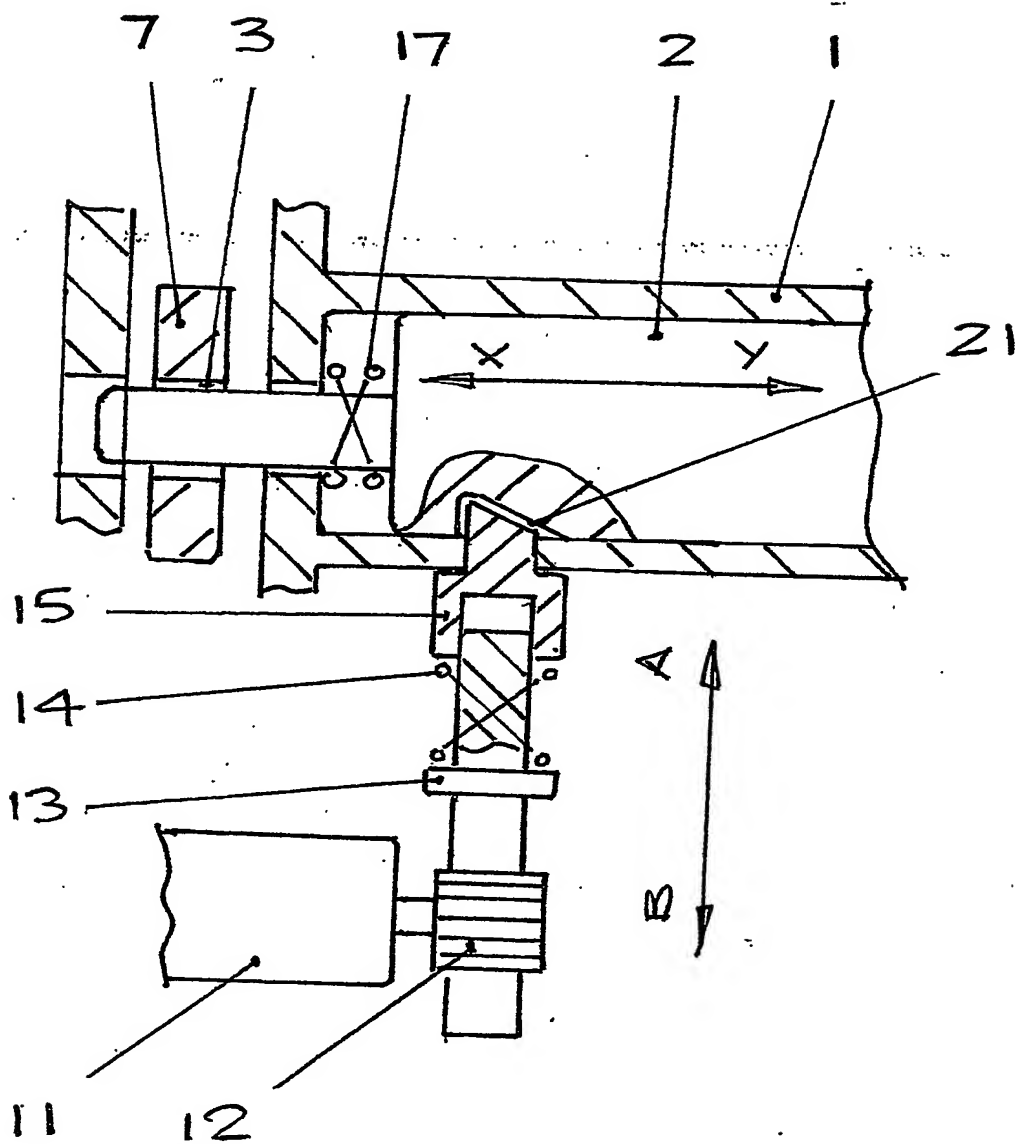


FIG 5

7.6

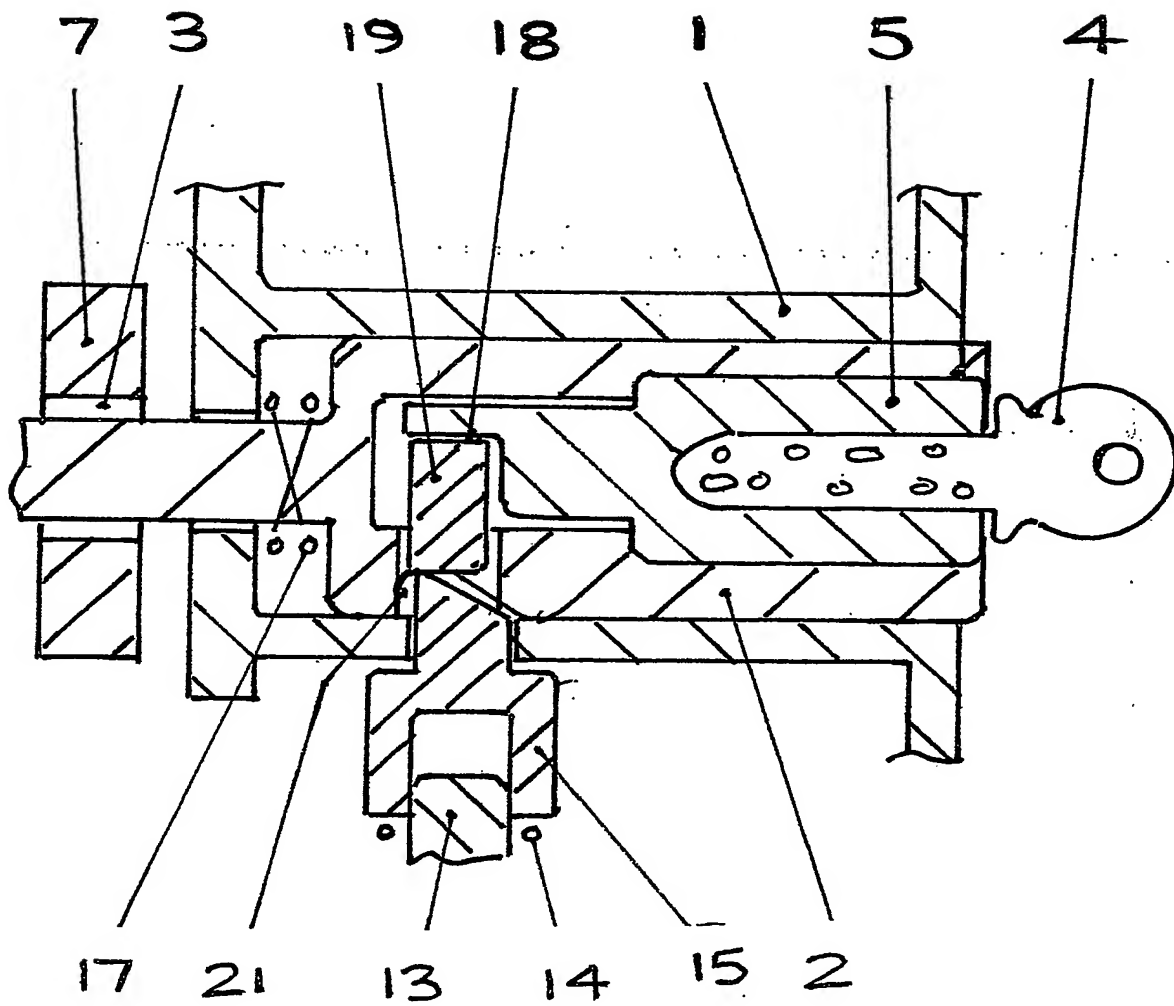


FIG 6.

7.

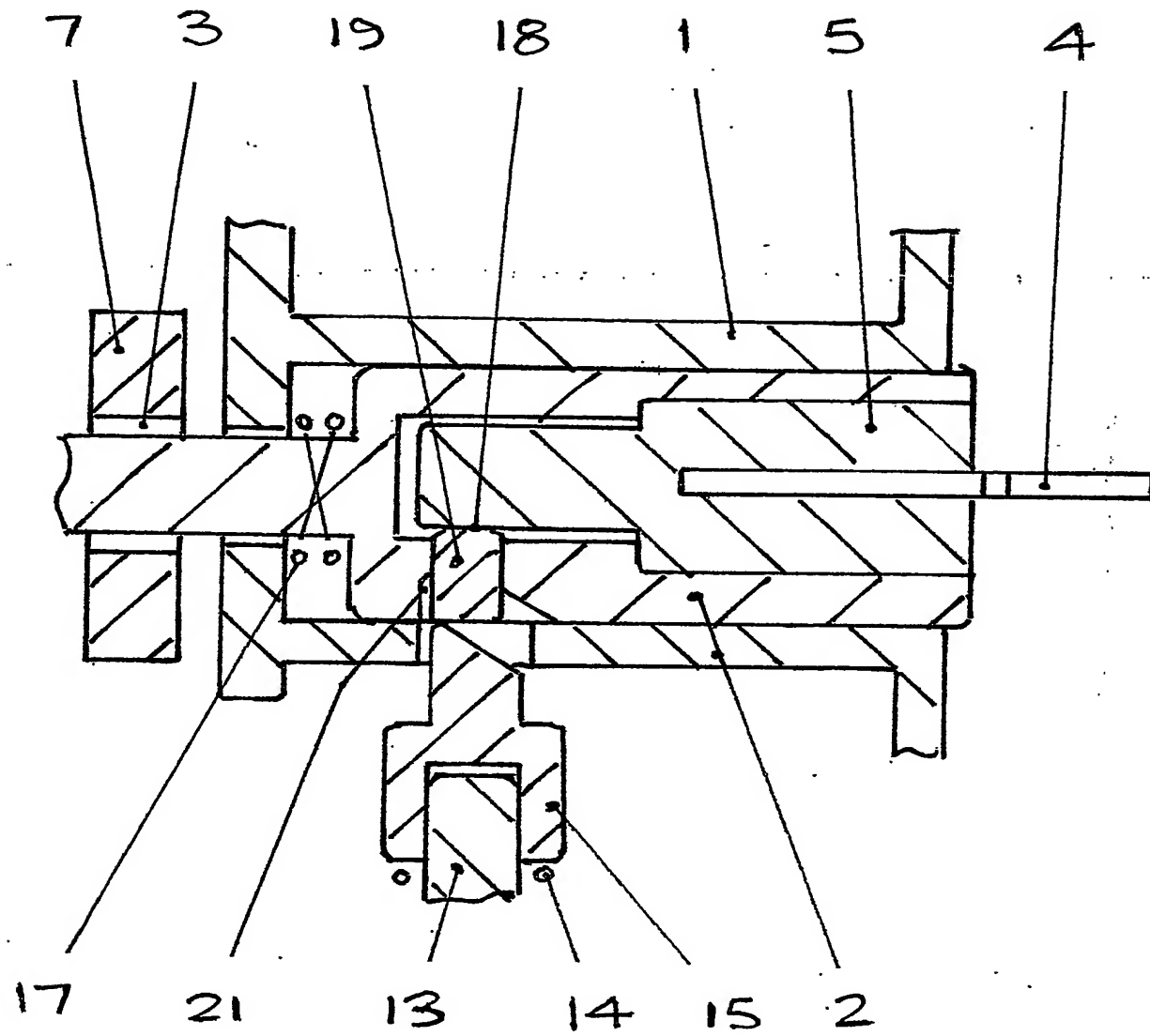


FIG 7

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